CLAIMS

Having described the preferred embodiments, the invention is now claimed to be:

1. A method of CT imaging in which an x-ray source (14) rotates around a subject, which subject is moved axially relative to the rotating x-ray source during an imaging scan characterized by:

modulating a level of radiation produced by the x-ray sources in accordance with both angular position of the x-ray source around the subject and axial position along the subject.

2. The method according to claim 1, further characterized by:

the level of radiation being modulated in accordance with radiation attenuation measured in a preceding revolution of the same imaging scan.

3. The method according to claim 2, further characterized by:

the level of radiation being modulated in accordance with radiation attenuation measured N(180°) preceding, where N is an integer.

4. A CT scanner including a processor programmed to perform the method according to claim 1.

5. A method of dose modulation in CT imaging comprising:

acquiring transmission tomographic imaging data of an associated imaging subject using a radiation source (14) revolving around the associated imaging subject;

during the tomographic imaging, determining an estimated attenuation of radiation for an upcoming position or angular bin (72_1, 82) of the revolving radiation source based on attenuations measured at previous positions or angular bins (70_1, 84, 90) of the radiation source; and

prior to acquiring tomographic imaging data at the upcoming position or angular bin, adjusting a level of radiation produced by the radiation source based on the estimated attenuation of radiation.

6. The dose modulation method according to claim 5, wherein the determining of an estimated attenuation of radiation includes:

estimating the attenuation based on attenuations measured for a previously acquired position or angular bin (70_1, 84) in which the radiation source (14) was about an integer multiple of a half-revolution away from the upcoming position or angular bin (72_1, 82).

7. The dose modulation method as set forth in claim 6, wherein the acquiring of tomographic imaging data includes:

relatively moving the associated imaging subject and the radiation source (14) in a longitudinal direction generally transverse to a plane of revolution of the radiation source such that the radiation source follows a generally helical trajectory respective to the associated imaging subject.

8. The dose modulation method as set forth in claim 6, wherein the radiation source (14) is an x-ray tube, and the adjusting of a level of radiation includes:

adjusting an x-ray current of the x-ray tube.

9. The dose modulation method as set forth in claim 8, wherein the adjusting of an x-ray current includes:

limiting the adjusting to a range defined by a minimum current value and a maximum current value.

10. The dose modulation method as set forth in claim 8, wherein the adjusting of an x-ray current includes:

adjusting the x-ray current proportional to a square-root of the estimated attenuation of radiation.

11. The dose modulation method as set forth in claim 8, wherein the adjusting of an x-ray current includes:

adjusting the x-ray current proportional to the estimated attenuation of radiation raised to a selected power.

12. The dose modulation method as set forth in claim 11, wherein the selected power is between about 0.1 and about 0.5.

13. The dose modulation method as set forth in claim 11, further including:

acquiring transmission tomographic imaging data of the associated imaging for an initial revolution (76) of the radiation source (14) using a preselected level of radiation; and

estimating a constant of proportionality between the x-ray current and the estimated attenuation of radiation raised to the selected power based on the transmission tomographic imaging data acquired in the initial revolution;

the adjusting of the x-ray current after the initial revolution being performed by multiplying the constant of the proportionality and the estimated attenuation of radiation raised to the selected power for each upcoming position or angular bin (72_1, 82).

14. The dose modulation method as set forth in claim 5, wherein the determining of an estimated attenuation of radiation includes:

the determining of an estimated attenuation of radiation includes (i) estimating a baseline radiation attenuation based on an average attenuation over an extended range of positions (90) preceding the upcoming position or angular bin (72_1, 82) and (ii) estimating an axial radiation attenuation based on a previously acquired position or angular bin (84) of the radiation source (14) disposed about a half-revolution away from the upcoming position; and

the adjusting of a level of radiation produced by the radiation source includes (i) determining a baseline current component based on a ratio of the estimated baseline attenuation of the upcoming position or angular bin (72_1, 82) and the average attenuation of the initial revolution, (ii) determining an axial current component based on a ratio of the estimated axial attenuation of the upcoming position or angular bin (72_1, 82) and a maximum or average attenuation of a present revolution, and (iii) determining the a total x-ray current by combining the baseline and axial x-ray current components.

15. The dose modulation method as set forth in claim 14, wherein the acquiring of tomographic imaging data includes:

acquiring helical tomographic imaging data.

16. The dose modulation method as set forth in claim **5**, wherein the estimating of a baseline modulation attenuation includes:

estimating the baseline modulation attenuation based on an average attenuation of transmission tomographic imaging data spanning an integer multiple of a revolution of the radiation source **(14)**.

17. A dose modulation processor **(42, 50)** for performing the dose modulation method set forth in claim **5**.

18. A dose modulated tomographic apparatus comprising:

a tomographic scanner **(10)** for acquiring transmission tomographic imaging data of an associated imaging subject, the tomographic scanner including a radiation source **(14)** revolving around the associated imaging subject;

a means **(42, 50, 52)** for determining an estimated attenuation of radiation for an upcoming position or angular bin **(72_1, 82)** of the revolving radiation source based on attenuations measured at previous positions or angular bins **(70_1, 84, 90)** of the radiation source; and

a means **(42, 44)** for adjusting a level of radiation produced by the radiation source based on the estimated attenuation of radiation.

19. The dose modulated tomographic apparatus as set forth in claim **18**, wherein the means **(42, 50, 52)** for determining an estimated attenuation of radiation includes:

a means **(42, 50, 52)** for determining a characteristic radiation attenuation for tomographic imaging data acquired over a previous revolution **(90)** of the radiation source **(14)**.

20. The dose modulated tomographic apparatus as set forth in claim **18**, wherein the radiation source **(14)** includes an x-ray tube, and the means **(42, 44)** for adjusting a level of radiation adjusts an x-ray current of the x-ray tube proportional to the estimated attenuation of radiation raised to a selected power.